

**Universal Design for Learning (UDL) and
Learners with Severe Support Needs**

**Elizabeth Hartmann, Ph.D.
Lasell College**

Author Note

Correspondence concerning this article should be addressed to Elizabeth S. Hartmann, Ph.D., Lasell College, 1844 Commonwealth Avenue, Newton, MA 02466. E-mail: ehartmann@lasell.edu; Telephone: 617 243-2177. The author would like to acknowledge the contribution to this article made by Peggy Coyne, Susan Bruce and Janet Sauer.

Elizabeth S. Hartmann is an Assistant Professor at Lasell College in Newton, MA. Her research interests include Universal Design for Learning (UDL), teachers' collaborative practice in general education and special education, and the development of symbolic understanding in early communicators.

To cite this article: Hartmann, E. (2015). Universal Design for Learning (UDL) and Learners with Severe Support Needs. *International Journal of Whole Schooling*, 11 (1), 54-67.

Abstract

This article presents the Universal Design for Learning (UDL) framework as one way to understand how to support learners with severe disabilities and how to support their access to authentic and appropriate curricula that improves their quality of life. Two key ideas from the UDL framework, (a) understanding learner variability and (b) supporting the expert learner, are reviewed and used to address the education of learners with severe disabilities. By using the UDL framework to better understand how to support this population teachers can reform curricula in ways that will create greater and more inclusive options for all students. The article shows how UDL can be used to support reform for this population and how this will improve education for all learners.

Keywords: Universal Design for Learning (UDL), severe disabilities, intellectual and developmental disabilities, access to general education curriculum, curriculum planning and instruction, inclusive classrooms

Early in my career as a teacher I taught a soft-spoken teenager named Marcus. He was a tall, happy guy who had multiple support needs related to being born prematurely. A review of his educational files might lead you to think of him as a student who was extremely limited by his disabilities. In page after page, therapists, teachers, and professionals detailed the ways in which multiple impairments (such as intellectual disability, visual impairment, seizures, cerebral palsy, speech and language impairment) manifested into failed developmental milestones and learning outcomes. But these reports failed to capture who he truly was: a sensitive and sweet teenager who was able to learn and develop once given the right supports, just like every other student.

Supporting Marcus was a loving single mother named Hannah. She was an exceptional advocate for her son. During an informal meeting to discuss Marcus' future as his transition to high school approached, Hannah asked me directly and with a tone of deep frustration, "Where do kids like Marcus go?" Although she was asking *where* Marcus would go, I knew she was also asking *what* he would be taught as he transitioned to high school. She was asking this question because in her search for a school for Marcus she found that possible placements in local public and private schools had curricula that were largely organized around categories of disability or severity of impairment, and the teachers she met were weary of how to accommodate his multiple support needs. For example, a local school for the blind was concerned about how he'd benefit from their curriculum given his intellectual disability, a program for learners with physical disabilities thought his cerebral palsy was too mild to benefit from their curriculum, a program for students with communication and behavioural support needs used a highly visual curriculum and the teacher stated unequivocally that it could not be adapted for him. In a nearby public school, an inclusion specialist frankly discussed how he had never seen someone as impaired as Marcus benefit from access to general education curriculum in an inclusive setting. A teacher of a separate or self-contained classroom within a public school thought that Marcus wouldn't learn in her classroom because the curriculum was designed to teach learners who were "non-verbal" and Marcus could speak. As I accompanied Hannah to observe schools, I realized that an appropriate setting with authentic access to curriculum was going to be challenging to find. Unfortunately, each teacher held tight to their classroom and curriculum while they justified how it couldn't possibly flex to include Marcus.

Hannah and Marcus' story emphasizes the continued need for advocacy of inclusive education. Her frustration and confusion over what her son should learn and where he should be taught illustrates the importance of supporting continued and meaningful access to curriculum for all learners. One reason Hannah struggled to find a placement for her son was because classrooms are often designed and developed around how teachers accommodate and modify curricula for discrete categories of disability or severity of impairment despite evidence from years of research that has found many benefits from providing student access to and progress in the general education curriculum for all learners (Jackson, Ryndak, & Wehmeyer, 2008; Wehmeyer, 2006).

Marcus is a unique student and not representative of all children with severe disabilities, however he is an important exemplar because he is one member of a growing and diverse group of children (Thompson et al., 2009) who need better access to and progress with flexible curricula that meet their varied needs (Doyle & Giangreco, 2009; Leyser & Kirk, 2004). This article discusses how using the Universal Design for Learning (UDL) framework can support inclusive education for learners with severe disabilities. The UDL framework addresses learning

of all students, regardless of their needs, however an examination of how the UDL framework relates to this specific population is warranted because it will show how all students can access and engage in learning that recognizes them as expert learners and how learner variability is a resource that improves education for all.

The UDL Framework

UDL is a multifaceted and nuanced theoretical framework of learning that draws on research in the fields of neuroscience, education, and technology. It conceptualizes teaching and learning as a dynamic system that must be reformed to better meet the needs of learners in the 21st century (Rose & Meyer, 2006). At its heart, UDL is about optimizing learning and access to the general education curriculum (Rose & Meyer, 2006). The UDL framework and three corresponding principles can be used to provide learners with authentic and meaningful opportunities to learn throughout their lives. It also helps teachers to design and implement curriculum that supports all learners from the start, including those with different abilities, needs, or backgrounds.

Important to the UDL framework is the concept of learner variability. Variability is the norm in today's schools and classrooms. Students have varying abilities, preferences, cultures, languages, and experiences, all of which affect how they learn (Meyer, Rose, & Gordon, 2014). Research in the learning sciences and neurology has found that all learners, even those who come from similar cultural backgrounds and have similar abilities, can vary greatly in how they approach learning tasks (Rose & Meyer, 2006). Learners, regardless of their similarities or differences, take very unique and diverse paths to understanding and mastering knowledge. For example, siblings can learn in ways that are very different from each other even though they come from similar genetic and cultural backgrounds.

Despite the diversity or variability found in learners, contemporary curriculum (i.e., the goals, methods, media/materials, and assessments used to support learning) is often designed and implemented for the imaginary "average" learner at the expense of teaching all students well (Rose & Meyer, 2006). In addition, curriculum is often developed under the premise that a "fair" curriculum is when everyone is learning in the same way (Meyer et al., 2014). Implementation of a narrow and inflexible curriculum that targets the "average" student comes at the expense of supporting all learners well, but is especially unfair for students with diverse backgrounds or who have differences in their abilities to learn. When students are paired with an inflexible curriculum, the variability found in learners is often perceived as a challenge that must be overcome through remediation of the student. The UDL framework helps teachers to see how inflexible curricula are the problem, not the learner (Gordon, Gravel, & Schifter, 2009; McGuire, Scott, & Shaw, 2006). Instead of seeing the variability of learners as being a challenge to overcome, UDL encourages teachers to ask, "Is the curriculum designed to optimize learning for all students?" Asking this simple yet critical question shifts the focus from viewing variability in the learner as the problem to recognizing that it is the curriculum and learning environment that needs to be fixed (Meo, 2008).

UDL, Variability, and Supporting Learners with Severe Disabilities

Marcus' variability as a learner was seen as a challenge and barrier to the prospective teachers that should have welcomed him into their classrooms. This was because curricula in

these educational settings were mainly organized around discrete categories of disability or severity of impairment. The teachers developed their curriculum to meet the needs of what they perceived to be the average student who experienced that particular disability or impairment. Therefore, the teachers perceived their curriculum as being static and unable to flex to optimize learning for all. The UDL framework challenges professionals who hold tight to inflexible curriculum to consider how it can include options and varied supports for all learners. This is an important and transformative shift that helps teachers to design and implement curriculum that is accessible, appropriate, and inclusive for all learners from the start (Pisha & Coyne, 2001; Pisha & Stahl, 2005). It helps teachers to appreciate the variability found in all learners and see how students like Marcus are capable and valued members of any learning environment. It also helps teachers to revisit their assumptions that curriculum can be designed or accommodated for a specific group or types of learners who have fixed qualities or abilities based solely on their support needs (Meyer et al., 2014). This oversimplification of curriculum and learner variability needs to be replaced with a more contemporary and respectful framework for learning.

For learners with severe disabilities, a shift in how their support needs are understood is desperately needed. Perhaps more than any other group of students, they have been subject to low expectations and incorrect assumptions of their capabilities (Jorgensen, McSheehan, & Sonnenmeier, 2007). For example, teachers may incorrectly presume that learners with severe disabilities do not have the competence needed to access the general education curriculum (Jorgensen et al., 2007) or think that intensity of support needs equates with intensity of intervention or pull-out services (Ward, 2008). In addition, teachers may feel that providing access to the general education curriculum is more important for students with “milder” disabilities than it is for students with severe disabilities (Agran, Cavin, Wehmeyer, & Palmer, 2006). Even within schools and classrooms that support learners with special needs, teachers may perceive that accommodating students with multiple severe disabilities is too challenging or difficult because of their severity or kinds of support needs.

The UDL framework states that learners with severe disabilities, like all learners, should not be defined by their perceived impairments because they require access to certain supports to learn. When teachers embrace the conceptual shift of the UDL framework and learner variability, they understand that severe disabilities are part of the natural diversity that is to be expected and embraced in classrooms. The UDL framework encourages teachers to expect more from their learning environments and consider what would happen if the curriculum was developed to include multiple ways in which learners with severe disabilities can: (a) engage in learning, (b) be resourceful, and (c) act on or show what they know. Considering learning in this way puts the onus for reform on the curriculum and not on the learner with severe disabilities to conform. Teachers can use UDL to identify barriers inherent in the curriculum, and design or develop flexible curricula that minimize barriers *before* assuming students with severe disabilities cannot learn or benefit from instruction (Coyne, Pisha, Dalton, Zeph, & Smith, 2010). Furthermore, it encourages a view of learners with severe disabilities as valued students who are able to develop and learn when curricula is proactively designed to meet their individual support needs (Ainscow, Howes, Farrell, & Frankham, 2003). The UDL framework supports teachers to shift their conceptions of curriculum to be more inclusive and realize that learner variability is natural and valued. For Marcus and Hannah, this shift in thinking may have provided them with options for him to be taught in his community in an inclusive setting with access to appropriate curricula. It also may have improved the learning for all of the students who would have been Marcus' classmate (Carter, Sisco, Chung & Stanton-Chapman, 2010).

All Students Are Expert Learners

The UDL framework helps teachers to understand variability and be more inclusive, but how does it provide guidance to teachers who continue to struggle with what students with severe disabilities should be taught? The UDL framework not only helps teachers to understand learner variability; it also provides teachers with clear ways to ensure that students have access to learning *and* that they develop a passion for learning throughout their lives (Rose & Meyer, 2006). In other words, the UDL framework helps teachers to understand that a major goal of instruction is that all learners develop a mastery of knowledge. In the UDL framework, mastering knowledge is about leading a fulfilling life, which occurs when students are motivated, resourceful, and strategic in their learning (Meyer, Rose, & Gordon, 2014).

The process of mastering knowledge is described as becoming an *expert learner*. Expert learners are defined as being: (a) purposeful and motivated; (b) resourceful and knowledgeable; and (c) strategic and goal directed (Meyer, Rose, & Gordon, 2014). The UDL framework provides specific principles and guidelines for teachers that allow them to develop and design curriculum to support their students in becoming expert learners (see Figure 1). For example, to be a purposeful and motivated learner, the UDL guidelines articulated by CAST (2011) suggest that teachers consider how their curriculum can provide learners with options to be engaged in what they are learning. To be a resourceful and knowledgeable learner, the UDL guidelines provide guidance on how to provide learners with multiple means of representation to foster deeper understanding of concepts. Lastly, to be a strategic and goal directed learner, the UDL guidelines suggest ways in which curriculum can provide learners with options to act on and show what they know.

Figure 1. UDL Principles and the Expert Learner

UDL Principle	Provide Multiple Means of Engagement	Provide Multiple Means of Representation	Provide Multiple Means of Action and Expression
Expert Learners Are:	Purposeful, motivated learners	Resourceful, knowledgeable learners	Strategic, goal-directed learners
In Practice	Marcus enjoys being with his peers and learns best when paired with a friend. He listens closely to their words and likes to repeat back what they've said.	Marcus learns best by tactually exploring materials. When auditory information is paired with tactual information he learns new concepts.	Marcus clearly and skilfully communicates his preferences. He vocalizes loudly and clearly when he knows his communication partner and is given

			2 to 3 choices.
--	--	--	-----------------

Important to UDL’s emphasis on the mastery of knowledge is the understanding that all learners, regardless of their complexity or severity of support needs, can become expert learners. Being an expert learner is not about mastering content. Rather, it is about how one understands and experiences life and turns everyday experiences into opportunities to learn and develop. Teachers who recognize how their learners are resourceful, strategic, and motivated are able to encourage the mastery knowledge by building on their students’ expertise. They are also able to sustain their students learning of content. Most importantly, they are able to make their classrooms inclusive and respectful of all types of learner variability. The purpose of schooling becomes focused on developing multiple, meaningful paths to learning, rather than perpetuating a one-size-fits-all mentality of learning where the consumption of content is the main goal (CAST, 2011).

Take Marcus for example, he was an expert learner because he actively experienced life and learned from it. As his teacher I saw him be an expert learner every day in our class. He was purposeful in how he would search out and find his close friends when they entered the room. He was resourceful in how he would use touch to explore and understand new materials and spaces around the classroom. He was strategic in how he would verbally ask for preferred activities but not respond to questions about activities he didn’t enjoy. Each of these competencies provided me with many opportunities to help him develop and learn. My view of him as an expert learner allowed me to know how to maximize his learning opportunities and minimize the barriers to his learning. It also allowed me to provide him with access to content that many other teachers and professionals in the school thought he was incapable of learning. In other words, understanding how he mastered knowledge helped me as his teacher to design curricula that would support him in mastering content. My understanding of what he can do, paired with the UDL guidelines (i.e., provide multiple means of engagement, representation, and action and expression) allowed me to develop more meaningful curriculum for him and his classmates.

Expert Learners and the General Education Curriculum

The UDL framework’s focus on being an expert learner addresses a key issue in the education of learners with severe disabilities: how do we best support learning that leads to meaningful experiences both in and out of school? For many professionals who support learners with severe disabilities, there is confusion over what constitutes appropriate curriculum and how this aligns with legislation that requires access to the general education curriculum and individualized education plans or IEPs. Marcus was protected by federal law (Individuals with Disabilities Improvement Education Act; IDEA, 2004), which states that learners with special needs must have access to, be involved with, and show progress in the general education curriculum. Although IDEA paves the way for access and engagement with the general education curriculum, it is unclear if access to grade-appropriate academic content is to be favoured over goals that may be outlined in students’ IEPs, which often are focused on skills

needed to access the general education curriculum or other skills needed to develop self-determination and independence in their lives (McLaughlin, 2010).

The ambiguity of IDEA and how the general education curriculum is defined creates many challenges. For one, it often leads teachers to come to their own understanding of what they should teach learners with severe disabilities. Agran, Alper, & Wehmeyer, (2002) found that the terms *access to the general education curriculum* means different things to teachers and was often synonymous with placement or classroom context versus the actual content of the curriculum. Second, curriculum that is narrowly defined and delivered in traditional and inflexible ways, may not lead to learning for students with severe disabilities (Jackson, Ryndak, & Wehmeyer, 2008; Ryndak, Moore, Orlando, & Delano, 2008). In fact parents, teachers and other advocates feel that the support needs of learners with severe disabilities are not comprehensively met when the general education curriculum is continually adapted or modified after the fact (Mancini & Layton, 2004; McLeskey, Henry, & Axelrod, 1999; Spooner & Browder, 2003; Spooner, Dymond, Smith, & Kennedy, 2006).

The UDL framework reframes this juxtaposition of the general education curriculum and the individualization of the IEP by stating that the goal for all students is deep and sustained engagement in learning. When the core agenda of schools is refocused and re-centred on the mastery of knowledge (Rose & Meyer, 2006) it becomes evident that priority should always be given to designing and developing curriculum that supports the development of expert learners and all classrooms should be defined by their commitment to supporting lifelong learning processes (e.g., supporting students to be (a) purposeful and motivated; (b) resourceful and knowledgeable; and (c) strategic and goal directed).

Teachers who implement UDL into curricula and make the mastery of knowledge foundational to all learning will naturally support access and engagement for learners with severe disabilities. If the general education curriculum is developed to support expert learners, learners with severe disabilities will be able to learn alongside their peers in meaningful ways. More importantly, they will have access to a curriculum that is respectful to how they experience the world, act upon it, and draw meaning from it. Curriculum goals that are focused on the mastery of learning can address *both* content and the skills necessary to engage with the content, such as the ability to collaborate, communicate, get along with others, and be a member of a community (Dymond et al., 2006). These skills amplify the learning of content, vocabulary, and concepts that are critical for developing knowledge, increasing understanding, and providing opportunities for socialization (Doyle & Giangreco, 2009). The UDL framework emphasizes the mastery of knowledge and thus allows for the mastery of content to be both possible and sustained both in and out of school. When learners achieve learning goals focused on their mastery of knowledge, they feel secure in their learning environment and have the resources needed to focus on explicit content-focused goals. They are learning the process and skills that sustain and motivate learners to understand and retain content.

A broader and more flexible view of curriculum benefits all learners, and, in particular, helps learners with severe disabilities to benefit from instruction that occurs alongside their peers (Snell, 2008). The UDL framework can clarify, design, and develop curricula worth learning, and create a rich foundation for pedagogy. For example, research has found that incorporating flexibility into the curriculum from the start allows for learners with severe disabilities to build off their strengths to access and engage in learning (Agran, Cavin, Wehmeyer, & Palmer, 2006; Browder, Mims, et al., 2008; Coyne et al., 2010). Likewise, research of students with and without learning disabilities has found that UDL implementation leads to improved student

outcomes (Dolan, Hall, Banerjee, Chun, and Strangman 2005; Rappolt-Schlichtmann et al., 2013). Despite the fact that research on implementation of UDL in learning environments is relatively new (Crevecoeur et al., 2014) the research is promising and suggests that UDL improves learning outcomes for all.

To be clear, this shift in thinking is not about retrofitting or merely adapting the general education curriculum. When any curricula is continually accommodated for learners with severe disabilities, it makes an improvement but it is still inequitable because it often occurs after the fact, requires special effort to implement, and may require students to go to a separate location to learn (Edyburn, 2010). UDL is a paradigm shift where the variability of learners is first and foremost. It is about providing access that is equitable through thoughtful and elegant curriculum design (Edyburn, 2010). It is about all students becoming expert learners.

Teachers who support learners with severe disabilities in becoming expert learners understand how their students' experience and understand life, express themselves, and find relevance and engagement in their lives. All learners with severe disabilities are able to become expert learners, because all individuals are knowledgeable, strategic, and purposeful. Like Marcus, all learners with severe disabilities, regardless of their type or severity of support needs bring a wealth of previous experiences, are able to formulate plans and are motivated. In contrast, when their abilities are *not* fully understood, valued, utilized, or seen as being non-traditional and socially unacceptable that these learners are thought to be unable to benefit from certain learning experiences and curricula. The UDL framework helps professionals reframe the purpose of schooling to see the value in how learners with severe disabilities make meaning and learn (Dymond et al., 2006).

When Hannah searched for classrooms for Marcus, the teachers were holding tight to a view of their curriculum as being only for the needs of specific students. They also believed that certain students needed very specific means and static teaching methods. Their approach made it seem as if there was no place for Marcus, as if he was the problem because he was not average. If the teachers and other professionals had a UDL view of curriculum then perhaps they wouldn't have been dismissive of him and his potential to learn in their classrooms. Instead, if they had understood him as an expert learner, they could have seen how his enrolment would have improved their teaching and strengthened learning for all students in the classroom by expanding the options for learning. For example, the inclusion of Marcus might have helped the teacher at the school for the blind provide options and varied ways to represent concepts for students at different cognitive or academic levels. Including Marcus might have helped the teachers at the program for learners with physical disabilities to provide their students with more ways to express themselves in the classroom. The teacher of students with communication and behavioural support needs or the teacher of the self-contained classroom might have questioned their use of a highly visual instructional strategies and realized that providing tactual options improved learning for all students. The inclusion specialist could have expanded on his own understanding of authentic access of the general curriculum by using UDL to provide Marcus with opportunities meaningful learning. In each of these instances, the teachers and professionals might have had the opportunity to better understand learner variability and question their assumptions that organizing classrooms and curriculum for average learners of learners with similar disabilities is best.

Conclusion

Universal Design for Learning (UDL) is a framework that is receiving widespread attention in educational policy and practice communities (Edyburn, 2010). It challenges us to re-conceptualize our traditional views of learning, teaching, and disability. When the curriculum is the focus of reform, and not the learner, it will improve learning outcomes for all (Hitchcock, Meyer, Rose, & Jackson, 2002). The UDL framework values learner variability and the need for curricula that are designed and implemented to be accessible, supportive, and engaging from the start.

Mere access to content in the curriculum is not enough. In the 21st century, learners need to be authentically engaged in learning processes *and* with curricular content (Bruce & Pine, 2010) to have an enhanced quality of life through shared experiences and increased independence (Browder et al., 2008; Browder, Mims, et al., 2008; Browder et al., 2006). The UDL framework highlights how low expectations and incorrect assumptions about learners with severe disabilities perpetuate and create barriers to their learning (Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007). It also shows how teachers' low expectations and incorrect assumptions are lessened understanding learner variability.

The UDL framework highlights an overemphasis on access to curricula that is inflexible and irrelevant and how this has come at the expense of developing curricula that leads to a high quality of life. When the ultimate goal of curriculum is focused on becoming an expert learner, it lessens the traditional and artificial dissections of curricula as being general or academic versus being individualized or functional (Sailor, 2008; Ward, 2008); general or special education (Wehmeyer, 2006). Categorizing curricula using these terms oversimplifies its purpose and minimizes how all learners can benefit from curriculum that is elegantly designed from the start. Curriculum needs to be flexible and responsive to all, not just a defined set or group of average students that do not exist.

The UDL framework is a useful theoretical and practical tool for thinking about learners with severe disabilities like Marcus. My wish is that families like Marcus and Hannah are able to find meaningful access to curriculum that is flexible to their needs and they are valued as learners. Perhaps if the professionals that Marcus's mother met had understood the UDL framework, they would have embraced the conceptual shift of viewing learner variability as a strength and thought of her son as an expert learner who is a valued member of their school community (Gabel, Cohen, Kotel, & Pearson, 2013). In addition, they may have realized that in applying UDL practices to support his learning, his presence in the class would improve learning for all. In this scenario, Hannah's key question of "Where do kids like Marcus go?" would shift to "Who wants to learn from what Marcus' knows?"

As the UDL framework is developed and implemented, further research is needed to help learners with severe disabilities meet their potential and improve their learning outcomes. Two important research questions that need to be addressed are: (a) how is the UDL framework important for learners with severe disabilities? and (b) how can learners with severe disabilities continue to inspire the development and implementation of the UDL framework? Research on promising practices is needed to determine how existing and evidence-based practices for educating learners with severe disabilities fit within the UDL framework. For example, research by Coyne et al. (2010) found that UDL designed literacy instruction led to positive and relevant learning outcomes for students with significant intellectual disability. Studies like this one are needed to support UDL environments and can be replicating within UDL-driven learning environments to learn more about implementation. Understanding how to best teach learners with severe disabilities can also help improve the UDL framework and educational practice for

all learners. It is clear that the variability found in diverse and low-incidence populations helps us to realize how curriculum can be flexible, relevant, and holds high standards for learning (Wehmeyer, 2006). Learners with severe disabilities, their families, and teachers all play a critical role in further developing the UDL framework and helping others to implement it appropriately.

In addition, implementation research is needed to extend the body of research on UDL practices to ensure that learners with severe disabilities are included in these full-scale, system-wide implementations. Previous research on teachers who implemented the UDL framework found that it was useful in their planning and facilitation of learning for students with severe disabilities (Blumberg, Carroll, & Petroff, 2008), but more work is needed to understand how teachers can understand concepts of learner variability and the expert learner, as these key ideas define the conceptual shift that UDL promotes.

In conclusion, there is great potential for the UDL framework to improve education for all learners, including those with severe disabilities. As shown, the theoretical foundation of UDL provides a way to look at the critical and systemic issues in education for learners with severe disabilities. The notion that the UDL framework is valuable for these learners is important and must be advocated for, even though the UDL framework has been mainly implemented in classrooms or curriculums where students with severe disabilities were not included (Copeland & Cosbey, 2008) and used to transform learning with certain technologies or supports that may not be fully accessible to this population (Edyburn, 2010). On the other hand, the emerging body of research on UDL and learners with severe disability has shown how the framework supports learning as a process of providing access *and* engagement in a community with one's peers in activities that are appropriate and worthwhile (Blamires, 1999; Coyne et al., 2010). The scope of the UDL framework is amazingly broad and not all research will incorporate all populations of learners, but this does not mean that the needs of learners with severe disabilities is any less important or worthy of study.

References

- Agran, M., Alper, S., & Wehmeyer, M. (2002). Access to the general curriculum for students with significant disabilities: What it means to teachers. *Education & Training In Mental Retardation & Developmental Disabilities*, 37(2), 123-133.
doi: 10.1177/00224669030370030501
- Agran, M., Cavin, M., Wehmeyer, M., & Palmer, S. (2006). Participation of students with moderate to severe disabilities in the general curriculum: The effects of the self-determined learning model of instruction. *Research and Practice for Persons with Severe Disabilities*, 31(3), 230-241.
- Ainscow, M., Howes, A., Farrell, P., & Frankham, J. (2003). Making sense of the development of inclusive practices. *European Journal of Special Needs Education*, 18(2), 227-242.
doi:10.1080/0885625032000079005
- Blamires, M. (1999). Universal design for learning: Re-establishing differentiation as part of the inclusion agenda? *Support for Learning*, 14(4), 158-163. doi:10.1111/1467-9604.00123
- Blumberg, R., Carroll, S., & Petroff, J. G. (2008). Career and community studies: an inclusive liberal arts programme for youth with intellectual disabilities. *International Journal Of Inclusive Education*, 12(5/6), 621-637. doi:10.1080/13603110802377672
- Browder, D., Flowers, C., & Wakeman, S. (2008). Facilitating participation in assessments and the general curriculum: Level of symbolic communication classification for students with significant cognitive disabilities. *Assessment in Education: Principles, Policy and Practice*, 15(2), 137-151. doi:10.1080/09695940802164176
- Browder, D. M., Mims, P. J., Spooner, F., Ahlgrim-Delzell, L., & Lee, A. (2008). Teaching elementary students with multiple disabilities to participate in shared stories. *Research and Practice for Persons with Severe Disabilities*, 33(1-2), 3-12.
- Browder, D. M., Spooner, F., Wakeman, S., Trela, K., & Baker, J. N. (2006). Aligning instruction with academic content standards: Finding the link. *Research and Practice for Persons with Severe Disabilities*, 31(4), 309-321.
- Bruce, S. M., & Pine, G. J. (2010). Action research in special education: An inquiry approach for effective teaching and learning. NY: Teachers College Press
- Carter, E. W., Sisco, L. G., Chung, Y., & Stanton-Chapman, T. L., (2010). Peer interactions of students with intellectual disabilities and/or Autism: A map of the intervention literature. . *Research and Practice for Persons with Severe Disabilities*, 35(3-4), 63-79.
- CAST (2011). Universal design for learning guidelines version 2.0. Wakefield, MA: Author
- Copeland, S. R., & Cosbey, J. (2008). Making progress in the general curriculum: Rethinking Effective Instructional Practices. *Research & Practice For Persons With Severe Disabilities*, 33/34(4-1), 214-227.
- Coyne, P., Pisha, B., Dalton, B., Zeph, L., & Smith, N. C. (2010). Literacy by design: A universal design for learning approach for students with significant intellectual disabilities. *Remedial and Special Education*, 33, 162-172.
- Crevecouer, Y. C., Sorenson, S. E., Mayorga, V., Gonzalez, A. P., (2014). Universal design for learning in K-12 educational settings: A review of group comparison and single-subject intervention studies. *The Journal of Special Education Apprenticeship*, 3(2), 1-23.

- Dolan, R. P., Hall, T. E., Banerjee, M., Chun, E., & Strangman, N. (2005). Applying principles of universal design to test delivery: The effect of computer-based read-aloud on test performance of high school students with learning disabilities. *The Journal of Technology, Learning, and Assessment*, 3(7), 4-32.
- Doyle, M., & Giangreco, M. F. (2009). Making presentation software accessible to high school students with intellectual disabilities. *Teaching Exceptional Children*, 41(3), 24-31.
- Dymond, S. K., Renzaglia, A., Rosenstein, A., Chun, E. J., Banks, R. A., Niswander, V., et al. (2006). Using a participatory action research approach to create a universally designed inclusive high school science course: A case study. *Research and Practice for Persons with Severe Disabilities*, 31, 293-308.
- Edyburn, D.L. (2010). Would you recognize universal design for learning if you saw it? Ten propositions for new directions for the second decade of UDL. *Learning Disability Quarterly*, 33(1), 33-41.
- Gabel, S. L., Cohen, C. J., Kotel, K., & Pearson, H. (2013). Intellectual disability and space: Critical narratives of exclusion. *Intellectual and developmental disabilities*, 51(1), 74-80.
- Gordon, D. T., Gravel, J. W., & Schifter, L. A. Eds., (2009). *A policy reader in universal design for learning*. Cambridge, MA: Harvard Education Press.
- Hitchcock, C., Meyer, A., Rose, D., & Jackson, R. (2002). Providing new access to the general curriculum. *Teaching Exceptional Children*, 35(2), 8.
- Jackson, L. B., Ryndak, D. L., & Wehmeyer, M. L. (2008). The dynamic relationship between context, curriculum, and student learning: A case for inclusive education as a research-based practice. *Research and Practice for Persons with Severe Disabilities*, 33(4), 175-195.
- Jorgensen, C. M., McSheehan, M., & Sonnenmeier, R. M. (2007). Presumed competence reflected in the educational programs of students with IDD before and after the BeyondAccess professional development intervention. *Journal of Intellectual and Developmental Disability*, 32, 248-262. doi:10.1080/13668250701704238
- Leyser, Y., & Kirk, R. (2004). Evaluating inclusion: An examination of parent views and factors influencing their perspectives. *International Journal of Disability, Development, & Education*, 51, 271-285. doi: 10.1080/1034912042000259233
- Mancini, K. G., & Layton, C. A. (2004). Meeting fears and concerns effectively: The inclusion of early childhood students who are medically fragile. *Physical Disabilities: Education and Related Services*, 22(2), 29-48.
- McGuire, J. M., Scott, S. S., & Shaw, S. F. (2006). Universal design and its applications in educational environments. *Remedial and Special Education*, 27(3), 166-175.
- McLaughlin, M. J. (2010). Evolving interpretations of educational equity and students with disabilities. *Exceptional Children*, 76, 263-278.
- McLeskey, J., Henry, D., & Axelrod, M. I. (1999). Inclusion of students with learning disabilities: An examination of data from reports to Congress. *Exceptional Children*, 66, 55-66.
- Meo, G. (2008). Curriculum planning for all learners: Applying universal design for learning (UDL) to a high school reading comprehension program. *Preventing School Failure*, 52(2), 21-30.
- Meyer, A., Rose, D.H., & Gordon, D. (2014) *Universal design for learning: Theory and practice*, Wakefield MA: CAST.
- Pisha, B., & Coyne, P. (2001). Smart from the start: The promise of universal design for

- learning. *Remedial and Special Education*, 22(4), 197.
- Pisha, B., & Stahl, S. (2005). The promise of new learning environments for students with disabilities. *Intervention in School and Clinic*, 41(2), 67.
- Rappolt-Schlichtmann, G., Daley, S. G., Lim, S., Lapinski, S., Robinson, K. H., & Johnson, M. (2013). Universal design for learning and elementary school science: Exploring the efficacy, use, and perceptions of a web-based science notebook. *Journal of Educational Psychology*, 105, 1210- 1225. doi 10.1037/a0033217
- Rose, D. H., & Meyer, A. (2006). *A practical reader in universal design for learning* Harvard Education Press.
- Ryndak, D. L., Moore, M. A., Orlando, A. M., & Delano, M. (2008). Access to the general curriculum: The mandate and role of context in research-based practice for students with extensive support needs. *Research and Practice for Persons with Severe Disabilities*, 33/34(4-1), 199-213.
- Sailor, W. (2008). Access to the general curriculum: Systems change or tinker some more? *Research and Practice for Persons with Severe Disabilities*, 33/34(4-1), 249-257.
- Snell, M. E. (2008). Rethinking effective instructional practices: A response to Copeland and Cosbey. *Research and Practice For Persons With Severe Disabilities*, 33/34(4-1), 228-231.
- Spooner, F., Baker, J. N., Harris, A. A., Ahlgrim-Delzell, L., & Browder, D. M. (2007). Effects of training in universal design for learning on lesson plan development. *Remedial and Special Education*, 28(2), 108.
- Spooner, F., & Browder, D. M. (2003). Scientifically based research in education and students with low incidence disabilities. *Research and Practice for Persons with Severe Disabilities*, 28(3), 117-125. doi:10.2511/rpsd.28.3.117
- Spooner, F., Dymond, S. K., Smith, A., & Kennedy, C. H. (2006). What we know and need to know about accessing the general curriculum for students with significant cognitive disabilities. *Research and Practice for Persons with Severe Disabilities*, 31(4), 277-283. doi:10.1177/0888406409356184
- Thompson, J. R., Bradley, V., Buntinx, W., Schalock, R. L., Shogren, K. A., Snell, M. E., Wehmeyer, M. L., Borthwick-Diffy, S., Coulter, D. L., & Craig, E. M. (2009). Conceptualizing supports and the support needs of people with intellectual disability. *Intellectual and Developmental Disabilities*, 47, 135–146. doi:10.1352/1934-9556-47.2.135
- Ward, T. (2008). Voice, vision, and the journey ahead: Redefining access to the general curriculum and outcomes for learners with significant support needs. *Research and Practice for Persons with Severe Disabilities*, 33(4), 241-248.
- Wehmeyer, M. L. (2006). Universal design for learning, access to the general education curriculum and students with mild mental retardation. *Exceptionality*, 14(4), 225-235. doi:10.1207/s15327035ex1404_4